CORESTA

COLLABORATIVE STUDY

on the

MEASUREMENT OF PAPER PERMEABILITY

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EXPERIMENTAL PROTOCOL

0.0 INTRODUCTION

0.1 The draft results from the first study (Study A) on the measurement of paper permeability, the objectives of which were to assess the effect of;

- ❑ sucking as opposed to blowing the air through the sample,
- ❑ varying the area and the shape of the measuring head,
- ❑ varying ambient conditions i.e. temperature, relative humidity, and atmospheric pressure,

were discussed at a meeting in Neuchâtel on 16th June, 1993.

The final report, issued during August 1993, was reviewed and approved at a Task Force Meeting held in Southampton on 14 October 1993.

0.2 At this meeting it was agreed that:

0.2.1 Only one set of ambient conditions should be specified for conditioning and testing viz. 23°C and 50% RH (ISO R187 / BS3431 / DIN50014).

However, the meeting agreed the wording of two paragraphs which enabled those labs who do not have the facility to maintain these conditions to undertake measurement and report the alternative environment with their analytical data. A copy of these paragraphs is given as appendix 6.

0.2.2 The magnitude of the effect of sucking versus blowing the air through the sample was of no practical importance (although the statistical analysis of the data had shown some significant differences).

0.2.3 As differences in head geometry gave rise to data which showed variance in observed permeability the head geometry must be standardised.
A rectangular head of precisely 2 cm^2 (20 mm x 10 mm) will be used.
The length 20 mm must be tightly specified and the width should be a nominal 10 mm but with a wider tolerance to allow for those clamps with rounded corners (corner radius < 3 mm)

0.2.4 All CORESTA permeability measurements will be made with a pressure drop of 1 ± 0.1 kPa across the sample and reported at a calculated pressure drop of 1.0Kpa.

0.2.5 Following the successful completion of Study A a Collaborative Study should be organised to determine the reproducibility and repeatability of a method based on (0.2.1) to (0.2.4) above.

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1.0 OBJECTIVES OF THE STUDY

1.1 The objectives of this study were agreed at the CORESTA Task Force Meeting held in Southampton on 14 October 1993.
These objectives were:

1.1.1 To determine the values of repeatability (r) and reproducibility (R) as defined by ISO 5725 in order that these values may be quoted as required by ISO and/or CORESTA in any future standard.

1.1.2 To reconfirm the results from Study A concerning the effect (if any) of sucking versus blowing the air through the sample.

2.0 VARIABLES

2.1 Target variables.

2.1.1 There is only one target variable for this test - paper permeability.

2.2 Explanatory variables.

2.2.1 The explanatory variables are:

- Type of measuring instrument.

2.3 Variables to be reported.

2.3.1 The variables to be reported are:

- date of conditioning
- temperature during conditioning
- relative humidity during conditioning
- date of test
- measurement of paper permeability
- temperature at time of test
- relative humidity at time of test
- atmospheric pressure at time of test

2.4 Dimensions and rounding of test results.

date of conditioning	ddmmyy	######
temperature during conditioning	°C	##.#
relative humidity during conditioning	%RH	##.#
date of test	ddmmyy	######
paper permeability units	CORESTA	####=.#
temperature at time of test	°C	##.#
relative humidity at time of test	%RH	##.#
atmospheric pressure at time of test	kPa	###.#

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3.0 DESIGN OF THE STUDY

3.1 Types of paper.

3.1.1 The study will use six papers coded as follows:

A Cigarette wrap.
Nominal permeability about 20 CU.
Supplier - Wattens.

B Cigarette wrap.
Nominal permeability about 50 CU.
Supplier - Wattens.

C Plug wrap.
Nominal permeability about 2 000 CU.
Supplier - Schoeller & Hoesch.

D Plug wrap.
Nominal permeability about 20 000 CU.
Supplier - Schoeller & Hoesch.

E Tipping paper (micro laser perforated).
Nominal permeability about 200 CU.
Supplier - Papeteries de Mauduit.

F Tipping paper (micro laser perforated).
Nominal permeability about 1 000 CU.
Supplier - Papeteries de Mauduit.

Note: Samples from existing bobbins obtained for Study A must not be used.

3.1.2 Each laboratory will receive sample strips of each of these papers, these strips to be taken at random from the bobbins supplied by the makers.

3.1.3 Details of the method of sampling the paper bobbins are given in Appendix 2 to this protocol.

3.1.4 The study co-ordinator, B. Camm, will be responsible for carrying out the sampling of the bobbins, and the distribution of the samples to the participating laboratories.

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3.2 Test Instruments.

3.2.1 During the execution of this study each of the participating laboratories will be requested to use as many different types of test instrument, which comply to the essential principles of the specification, as are available to them.

3.2.2. Codings of the test instruments given in Appendix 1, along with the laboratory codes to be used in the data files.
(See Appendix 4 for details of the structure of these files).

3.3 Environmental conditions.

3.3.1 The environmental conditions to be used are 23°C & 50%RH as given in 0.2.1 above and deviation from these conditions should be noted accordingly.

3.4 Testing plans.

3.4.1 The testing plans will incorporate the six papers shown as A, B, C, D, E, and F in the test schedule, using the coding given in 3.1.1 above.

3.4.2 For each measurement 30 readings will be taken, i.e. 10 readings from 3 strips, each of these 3 strips being taken at random from a bobbin.
Each reading is to be taken at a different position on each strip with a displacement of at least 2 cm between measurements.
For details of the selection of the strips see Appendix 2.

3.4.3 These measurements will be replicated on 3 different (but not necessarily consecutive) days totalling 90 measurements for each paper type.
Fresh sample strips will be used each day.
The sample strips used on previous days will be retained.

3.4.4 For this study, one test result is defined as the mean of the 10 readings taken on a single strip using a single instrument in a single replicate test.

3.4.5 The sequence to be followed when taking readings is shown in Appendix 3 to this protocol.

3.4.6 Papers E and F, the tipping papers, are double width and have perforations on both the left and a right hand sides.
Only the left hand side - marked by Mr. B. Camm when the sample strips are taken from the bobbin - should be measured.
The right hand side should be ignored.
These papers will be marked on their 'outer' surface to ensure their correct orientation in the measurement head i.e., the direction of airflow through the perforations should be from the outside to the inside of the paper.

3.4.7 Cigarette papers A and B, and plug wrap papers C and D, will be marked on their 'outer' surface to ensure their correct orientation in the measurement head i.e.. the direction of airflow through the perforations should be from the outside to the inside of the paper.

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4.0 DATA

4.1 Exchange of data.

4.1.1 All the data arising from this study will be made available to all the laboratories participating in the study.

4.1.2 To facilitate the exchange of the data all laboratories will be asked to send their results to the study co-ordinator B. Camm.

4.1.3 The format and medium to be used for the reporting of results is shown in Appendix 4 to this protocol.

4.2 Collation and analysis of the data.

4.2.1 All data will be collated prior to its distribution to the participating laboratories.

4.2.2 The data will be collated and analysed by a consultant statistician (E.B. Wilkes).

4.2.3 Each of the participating laboratories will receive a copy of the report of the results of the study.

5.0 GENERAL REMARKS

5.1 A list of the laboratories participating in this study, along with the test instruments they have available, is given in Appendix 1 to this protocol.

5.2 If possible, each laboratory should use one operator throughout the course of this study.

5.3 The instrument leak test procedures recommended by the makers of the test instruments should be carried out prior to the execution of this study and should be repeated on each day of measurement.

5.4 When the leak test has been successfully completed, each instrument should be calibrated according to the instrument makers instructions.

5.5 The calibration should be checked on each subsequent day of the study.

5.6 The papers will be tested in a randomised sequence shown in Appendix 3 to this protocol.

5.7 All papers must be placed in the measuring head so that the measuring air will travel from the 'outside' face towards the 'inside' face of the paper as it is applied in the cigarette(see sections3.4.6 & 3.4.7).

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LIST OF PARTICIPATING LABORATORIES

LABORATORY	CODE	INSTRUMENTS AVAILABLE
BAT Hamburg	BATGE	A
BAT Southampton	BATUK	C,E
Borgwaldt	BORG	B
Colombia Tobaco	COLOM	A,I
de Mauduit	MAUDU	C,E,L,K
Filtrona Instruments	FIAL	C
Filtrona, Jarrow	JARRO	C
Fletcher	FLETC	J
Gallaher	GALLA	C,F
House of Prince	HOP	A
Imperial Tobacco	IMP	C,L
Japan Tobacco	JAPAN	C,M
Lana	LANA	G
Philip Morris-E	PME	C,E
Reemtsma	REEMT	A,B
Rothmans	BVROTHB	C
Rothmans Int.	ROTHI	C
Schoeller & Hoesch	SCHOE	A
SEITA	SEITA	G,H
Tabacalera	TABAC	C
Wattens	WATTS	B,C,D,E

LIST OF INSTRUMENT TYPES

INSTRUMENT TYPE	INSTRUMENT CODE
Borgwaldt A09	A
Borgwaldt A10	B
Filtrona PPM100	C
Filtrona PPM200	D
Filtrona PPM300	E
Filtrona Manual	F
Sodim P2	G
Sodim P20	H
Phobos	I
Skyd/PDF Porosity Profiler	J
PDM In-house instrument	K
ITL In-house instrument	L
JTI In-house instrument	M
Sodim P60	N

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METHOD OF BOBBIN SAMPLING

The study co-ordinator, B. Camm, will be responsible for carrying out this sampling procedure, and for distributing the samples to the participating laboratories.

Procedure:

1. Each bobbin will be slit from edge to centre to provide individual strips of paper.

2. The first (outside) 20 strips will be discarded.

3. The next 500 strips will be randomised.

4. A set of 12 strips will be sent to each laboratory for each instrument to be used. Each instrument will require a different set of strips, and each strip will be tested once only.

5. Of these, 9 strips will be used for the study.

6. The 3 remaining strips will be spares to be used if a strip is accidentally spoiled.

7. As described in section 3.4.6, Tipping Papers E and F, are double width and have perforations on both the left and a right hand sides.
Only the left hand side - marked by Mr. B. Camm when the sample strips are taken from the bobbin - should be measured.
The right hand side should be ignored.
These papers will be marked on their 'outer' surface to ensure their correct orientation in the measurement head i.e., the direction of airflow through the perforations should be from the outside to the inside of the paper.

8. As described in section 3.4.7, Cigarette Papers A and B, and Plug Wrap Papers C and D, , will be marked on their 'outer' surface to ensure their correct orientation in the measurement head i.e., the direction of airflow through the perforations should be from the outside to the inside of the paper.

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TESTING SEQUENCE OF PAPER STRIPS TO BE USED FOR EACH INSTRUMENT

Procedure:

1. On the first day the papers will be tested in the following order:

   A D E B F C

2. On the second day the papers will be tested in the following order:

   B C D F A E

3. On the third day the papers will be tested in the following order:

   F E A C D B

4. On each day of testing 30 readings will be taken from each paper, i.e. 10 readings per strip from 3 strips.
   Each reading is to be taken at a different position on each strip with a displacement of at least 2 cm between measurements.

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FORMATTING AND COLLECTION OF COLLABORATIVE STUDY DATA

This Appendix gives information concerning the recording and collection of data for this CORESTA Study on the Measurement of Paper Permeability.

Given is:

- a list of the variables used and the order in which they must be written on the data files.
  Examples are also given.

- details of the computer disk to be used for data transmission.

- a set of data forms to be used if data cannot be transmitted via a disk.
  The participating laboratories will be expected to photo-copy these data forms as required.

Please note that each disk will contain two files. The first file will contain information about the environmental conditions used during the study. The second file will contain the results of the measurements.
The structure of these files assumes that all six papers will be conditioned simultaneously, and will be tested on the same day on one instrument to provide one replicate.
Samples of the six papers may however be placed in the conditioning atmosphere on different dates to allow testing on alternative instruments.
It is not necessary for all instruments to be tested on the same day.

Order Of Variables On The First Data File

Each row of the first file must contain data for 8 variables as follows:

```
LAB   DATEC  TC   RHC  DATET  TT RHT    PRESS
(1)    (2)   (3)  (4)   (5)  (6) (7)     (8)

FORMAT (A5, I7, 2F5.1, I7, 2F5.1, F6.1)
```

Example of first 3 lines of the first data file.

```
LAB   DATEC  TC   RHC  DATET  TT RHT    PRESS
GALLA 030794 21.9 49.8 060794 22.0 50.1  99.3
GALLA 030794 22.0 50.1 060794 22.0 49.3 100.1
```

All variables are to be right-justified within the field. This format uses 45 characters and can be written as a single line on most computer terminals.

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Explanation of Variable Labels

#	Label Definition	Value	Length
1.	LAB = Laboratory code Format |x|x|x|x|x| Uses columns 1 to 5 of the data file	See Appendix 1	A5
2.	DATEC = Date of start of conditioning Format |s|D|D|M|M|9|4| Uses columns 6 to 12 of the data file 's' is a space DD is the day of the month MM is the month of the year 94 is the year	DDMMYY	I7
3.	TC = Temperature during conditioning Format |s|#|#|.|#| Uses columns 13 to 17 of the data file 's' is a space '.' Is the decimal point	##.#	F5.1
4.	RHC = Relative humidity during conditioning Format |s|#|#|.|#| Uses columns 18 to 22 of the data file 's' is a space '.' Is the decimal point	##.#	F5.1
5.	DATET = Date of test Format |s|D|D|M|M|9|4| Uses columns 23 to 29 of the data file See (2) above	DDMMYY	I7
6.	TT = Ambient temperature during test Format |s|#|#|.|#| Uses columns 30 to 34 of the data file See (4) above	##.#	F5.1
7.	RHT = Ambient relative humidity during test ##.# Format |s|#|#|.|#| Uses columns 35 to 39 of the data file See (4) above	F5.1	
8.	PRESS = Atmospheric pressure during test Format |s|#|#|#|.|#| Uses columns 40 to 45 of the data file See (4) above. If the pressure is less than 100 kPa then there will be 2 spaces	###.#	F6.1

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Order Of Variables On The Second Data File

Each pair of rows of the second file must contain data for 17 variables as follows:-

First row of pair:	LAB	DATET	OP	DAY	INS	PAP	STR	P1	P2	P3	P4	P5
	(1)	(2)	(3	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Second row of pair:								P6	P7	P8	P9	P10
								(13)	(14)	(15)	(16)	(17)

FORMAT (A5, I7, A3, I4, 2A4, I4,5F8.1/31X,5F8.1)
Examples:

LAB	DATET	OP	DAY	INS	PAP	STR	P1	P2	P3	P4	P5
							P6	P7	P8	P9	P10
ROTHI	160794	A	1	C	C	1	197.3	204.5	215.6	191.7	211.3
							212.5	199.4	203.8	200.0	199.5
ROTHI	160794	A	1	C	A	1	28.6	22.4	29.8	24.3	22.1
							27.5	23.9	27.0	26.2	25.6

Note:

All variables are to be right justified within the field. This format uses 71 characters and can be written as a pair of lines on most computer terminals.

Explanation of Variable Labels

#	Label	Definition	Value	Length
1.	LAB	= Laboratory code Format |x|x|x|x|x| Uses columns 1 to 5 of the first row of each pair of rows in the data file	See Appendix 1	A5
2.	DATEC	= Date of test Format |s|D|D|M|M|9|4| Uses columns 6 to 12 of the first row of each pair of rows in the data file 's' is a space. DD is the day of the month MM is the month of the year 93 is the year	DDMMYY	I7
3.	OP	= Operator code Format |s|s|x| Uses columns 13 to 15 of the first row of each pair of rows in the data file 's' is a space. Use A for the first operator Use B for the second operator (if required)	A,B etc.	A3
4.	DAY	= Day number Format |s|s|s|#| Uses columns 16 to 19 of the first row of each pair of rows in the data file 's' is a space.	1,2,3	I4

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5. INS = Instrument code A to M I4
   Format |s|s|s|x|
   Uses columns 20 to 23 of the first row of each pair of rows in the data file
   's' is a space.

6. PAP - Paper code A to F A4
   Format |s|s|s|x|
   Uses columns 24 to 27 of the first row of each pair of rows in the data file
   's' is a space.

7. STR = Strip number 1 to 5 I4
   Format |s|s|s|#|
   Uses columns 28 to 31 of the first row of each pair of rows in the data file
   's' is a space.

8. P1 = 1st permeability reading #####.# F8.1
   Format |s|#|#|#|#|.|#|
   Uses columns 32 to 39 of the first row of each pair of rows in the data file
   's' is a space.

9. P2 = 2nd permeability reading #####.# F8.1
   Format |s|#|#|#|#|.|#|
   Uses columns 40 to 47 of the first row of each pair of rows in the data file
   's' is a space.

10. P3 = 3rd permeability reading #####.# F8.1
    Format |s|#|#|#|#|.|#|
    Uses columns 48 to 55 of the first row of each pair of rows in the data file
    's' is a space.

11. P4 = 4th permeability reading #####.# F8.1
    Format |s|#|#|#|#|.|#|
    Uses columns 56 to 63 of the first row of each pair of rows in the data file
    's' is a space.

12. P5 = 5th permeability reading #####.# F8.1
    Format |s|#|#|#|#|.|#|
    Uses columns 64 to 71 of the first row of each pair of rows in the data file
    's' is a space.

13. P6 = 6th permeability reading #####.# F8.1
    Format |s|#|#|#|#|.|#|
    Uses columns 32 to 39 of the second row of each pair of rows in the data file
    's' is a space.

14. P7 = 7th permeability reading #####.# F8.1
    Format |s|#|#|#|#|.|#|
    Uses columns 40 to 47 of the second row of each pair of rows in the data file
    's' is a space.

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15. P8 = 8th permeability reading ######.# F8.1
Format |s|#|#|#|#|#|.|#|
Uses columns 48 to 55 of the second row of each pair of rows in the data file
's' is a space.

16. P9 = 9th permeability reading ######.# F8.1
Format |s|#|#|#|#|#|.|#|
Uses columns 56 to 63 of the second row of each pair of rows in the data file
's' is a space.

17. P10 = 10th permeability reading ######.# F8.1
Format |s|#|#|#|#|#|.|#|
Uses columns 64 to 71 of the second row of each pair of rows in the data file
's' is a space.

Note:

Please adhere strictly to the formats given above. It is much easier to read the data into computer files if all participating laboratories use the same format.

Write the sequence of variables as the **first record** on the **first data file** i.e.,

```
LAB    DATEC   TC  RHC  DATET   TT  RHT PRESS
```

and as the first two records on the second data file i.e.

```
LAB    DATET OP DAY INS PAP STR      P1      P2      P3      P4      P5
                                     P6      P7      P8      P9      P10
```

so that any accidental permutation of the variables can be detected.

The disk containing the two data files **must** be accompanied by a listing of the contents of the files on the disk.
Use IBM compatible 3.5 inch or 5.25 inch disks (single or double density).
The files **must** be in plain ASCII text.*(filename.txt)* **do not** use a save files from spreadsheets.

Tips for creation of ASCII text files:

Text files are prepared with a text editor or word-processing application (such as Windows Notepad or Write) and saved unformatted. This type of file is also known as an ASCII file and contains only the printable ASCII characters and the few control codes needed for minimal formatting, such as carriage returns and line feeds.
When typing lists of alphanumeric characters, the problem of 'snaking' columns is an old one, caused by the use of proportionally spaced fonts. This means that a figure 1 occupies less space than a 0, so the number 111 will occupy less space than 100. If one tries to line the numbers up manually it does not work - the solution is to use a fixed space font like Courier, which will solve this problem.
Windows Notepad uses a fixed space font and is very suitable for this exercise.

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If you have difficulty in meeting these requirements would you please refer to your own computing departments for assistance, or contact Mr. Barry J. Camm at Filtrona to investigate alternative possibilities.

The computer disk, when completed, should be sent to the study co-ordinator Mr. B. Camm at the following address:

Filtrona Instruments & Automation Limited
Rockingham Drive
Linford Wood East
Milton Keynes MK14 6LY

Telephone (0)908 233833 Telex 82429 Fax (0)908 235333

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FORM 1 CORRESPONDING TO FIRST DATA FILE

Laboratory _____

Note: A complete set of strips to be used in one test will be conditioned simultaneously.

Date of conditioning			Conditioned atmosphere		Date of testing			Test atmosphere		
DD	MM	YY	Temp	RH%	DD	MM	YY	Temp	RH%	Press
/	/	93			/	/	93			
/	/	93			/	/	93			
/	/	93			/	/	93			
/	/	93			/	/	93			
/	/	93			/	/	93			
/	/	93			/	/	93			
/	/	93			/	/	93			
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/	/	93			/	/	93			

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FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 1. SHEET 1.

Laboratory .

Instrument . Measuring Head . Operator .

Date of test	Paper		Permeability readings						
DD / MM / YY	code	Str	1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	A	1						--	--
----------	-	-							
/ / 93	A	2						--	--
----------	-	-							
/ / 93	A	3						--	--
----------	-	-							
/ / 93	D	1						--	--
----------	-	-							
/ / 93	D	2						--	--
----------	-	-							
/ / 93	D	3						--	--
----------	-	-							
/ / 93	E	1						--	--
----------	-	-							
/ / 93	E	2						--	--
----------	-	-							
/ / 93	E	3						--	--
----------	-	-							
/ / 93	B	1						--	--
----------	-	-							
/ / 93	B	2						--	--
----------	-	-							
/ / 93	B	3						--	--
----------	-	-							

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FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 1. SHEET 2.

Laboratory _____.

Instrument ___. Measuring Head ___. Operator ___.

Date of test	Paper		Permeability readings						
DD / MM / YY	code	Str	1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	F	1						--	--
----------	-	-							
/ / 93	F	2						--	--
----------	-	-							
/ / 93	F	3						--	--
----------	-	-							
/ / 93	C	1						--	--
----------	-	-							
/ / 93	C	2						--	--
----------	-	-							
/ / 93	C	3						--	--
----------	-	-							

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FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 2. SHEET 1.

Laboratory .

Instrument . Measuring Head . Operator .

Date of test	Paper		Permeability readings						
DD / MM / YY	code	Str	1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	B	1						--	--
----------	-	-							
/ / 93	B	2						--	--
----------	-	-							
/ / 93	B	3						--	--
----------	-	-							
/ / 93	C	1						--	--
----------	-	-							
/ / 93	C	2						--	--
----------	-	-							
/ / 93	C	3						--	--
----------	-	-							
/ / 93	D	1						--	--
----------	-	-							
/ / 93	D	2						--	--
----------	-	-							
/ / 93	D	3						--	--
----------	-	-							
/ / 93	F	1						--	--
----------	-	-							
/ / 93	F	2						--	--
----------	-	-							
/ / 93	F	3						--	--
----------	-	-							

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FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 2. SHEET 2.

Laboratory .

Instrument . Measuring Head . Operator .

Date of test DD / MM / YY	Paper code	Str	Permeability readings 1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	A	1						--	--
----------	-	-							
/ / 93	A	2						--	--
----------	-	-							
/ / 93	A	3						--	--
----------	-	-							
/ / 93	E	1						--	--
----------	-	-							
/ / 93	E	2						--	--
----------	-	-							
/ / 93	E	3						--	--
----------	-	-							

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APPENDIX 5

FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 3. SHEET 1.

Laboratory _____.

Instrument ____. Measuring Head ____. Operator ____.

Date of test	Paper		Permeability readings						
DD / MM / YY	code	Str	1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	F	1						--	--
----------	-	-							
/ / 93	F	2						--	--
----------	-	-							
/ / 93	F	3						--	--
----------	-	-							
/ / 93	E	1						--	--
----------	-	-							
/ / 93	E	2						--	--
----------	-	-							
/ / 93	E	3						--	--
----------	-	-							
/ / 93	A	1						--	--
----------	-	-							
/ / 93	A	2						--	--
----------	-	-							
/ / 93	A	3						--	--
----------	-	-							
/ / 93	C	1						--	--
----------	-	-							
/ / 93	C	2						--	--
----------	-	-							
/ / 93	C	3						--	--
----------	-	-							

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FORM 2 CORRESPONDING TO THE SECOND DATA FILE

DAY 3. SHEET 2.

Laboratory .

Instrument . Measuring Head . Operator .

Date of test	Paper		Permeability readings						
DD / MM / YY	code	Str	1/6	2/7	3/8	4/9	5/10	Mean	S.D.
/ / 93	D	1						--	--
----------	-	-							
/ / 93	D	2						--	--
----------	-	-							
/ / 93	D	3						--	--
----------	-	-							
/ / 93	B	1						--	--
----------	-	-							
/ / 93	B	2						--	--
----------	-	-							
/ / 93	B	3						--	--
----------	-	-							

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1. CONDITIONING ENVIRONMENT

Temperature : 23°C ± 1°C
Relative Humidity : 50 ± 5(% RH)

Note X: The above mean figures have been used as a standard for conditioning in the paper and board industry and are given in ISO 187.

In the tobacco industry and particularly for manufactured cigarettes the conditioning environment is 22°C and 60% RH (ISO 3402). An argument could have been made for conditioning cigarette paper under the same conditions used for conditioning cigarettes prior to smoking, especially as most cigarette manufacturers have this conditioning environment available.

Experiments have been conducted to determine the effect of using these two atmospheres on the measured paper permeability. Although inconclusive it is clear that no major differences occur. In fact there may be no significant difference in data obtained under the two conditions.

In laboratories, unable to use the standard conditions, it is permissible to use 22°C and 60% RH provided this is specified with the data report.

2. LABORATORY TESTING ATMOSPHERE

Temperature : 23°C ± 2°C
Relative Humidity : 50 ± 3(% RH)

Note Y: The above mean figures have been used as a standard for testing in the paper and board industry and are given in ISO187.

In the tobacco industry and particularly for manufactured cigarettes the testing environment is 22°C and 60% RH (ISO 3402). An argument could have been made for testing cigarette paper under the same conditions used for testing cigarettes prior to smoking, especially as most cigarette manufacturers have this testing environment available.

Experiments have been conducted to determine the effect of using these two atmospheres on the measured paper permeability. Although inconclusive it is clear that no major differences occur. In fact there may be no significant difference in data obtained under the two conditions.

In laboratories, unable to use the standard conditions, it is permissible to use 22°C and 60% RH provided this is specified with the data report.

Atmospheric Pressure : See Note Z

Note Z: It is not possible to control atmospheric pressure in the laboratory.
Consequently, the atmospheric pressure in the laboratory at the time of testing should be quoted with the data report.

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